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TITLE: Effectiveness of Acupressure Treatment for Pain Management and Fatigue Relief in Gulf War Veterans

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CONTRACTING ORGANIZATION: The Cleveland Clinic Foundation  
Cleveland, OH 44195

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## I. INTRODUCTION

This study will provide symptomatic veterans with acupressure treatment and determine its effectiveness in fatigue relief and pain management for GWI disease. We plan to recruit patients who report they have symptoms of GWI through the Department of Veterans Affairs (VA), and randomize them into acupressure group (to receive acupressure treatment) and control group (Reiki). The acupressure treatment will be offered twice per week for 6 weeks. Evaluations will be made before and after treatment, and clinical outcomes will be compared between groups (acupressure group vs control group) and between different stages (before treatment vs. after treatment) within the same group.

Aim 1 is to investigate the effectiveness of acupressure for fatigue relief and pain management in veterans with GWI.

Aim 2 is to investigate the relationship between EEG measures, specifically the corticomuscular coherence and power spectra in theta band, and the clinical measures.

## II. KEYWORDS

Acupressure, Reiki, Gulf War Illness, fatigue, chronic headache, musculoskeletal pain, electroencephalography, non-invasive, pain management, quality of life

## III. STUDY PROGRESS

The study received continuing renewal approval from Cleveland Clinic IRB and the approval expiration date is 10/18/2015.

The study is being conducted at only one site – Cleveland Clinic Foundation.

| Investigational Site  | Investigators   |
|---|---|
| Cleveland Clinic Foundation<br>9500 Euclid Avenue,<br>Cleveland, OH 44195 | Vernon Lin MD PhD<br>John Lee MD<br>Juliet Hou MD<br>Xiaofeng Wang PhD<br>Guang Yue PhD<br>Honglian Huang MD PhD<br>Jamie Starkey LAc<br>Xiaoming Zhang PhD<br>Vinoth Ranganathan MSE MBA<br>Shuyun Jiang MD (Consultant)<br>Ernie Betz (Consultant – Reiki)<br>Wenning Zhao (Consultant - Acupressure)<br>Mehmed B. Bayram PhD (Consultant – EEG)<br>Vlodek Siemionow PhD (Consultant - EEG) |

We acquired a new 8-channel EEG-EMG system during this reporting period. Drs. Bayram and Yue visited Cleveland and assisted the study team with initial data collection. Grip force, surface EMG and scalp EEG signals were recorded before and during the treatment period. Health status was evaluated by physical examination, revised Piper Fatigue Scale (rPFS), Brief Pain Inventory (BPI), and Short Form 36 (SF-36) before and during the treatment. Subject enrollment

activities have been increased. Online advertisement process was initiated and we expect to enroll 2-3 subjects each month going forward.

### Study Advertisements

IRB had previously approved the text for placing study advertisements in Plain Dealer and other publications. Since these are very expensive, CCF Marketing recommended using online media as a cost effective method to recruit study subjects. The advertisement text (4 versions) was developed by CCF Marketing based on IRB approved flier for this study.

The online ads will be placed on contextually relevant sites with content related to Gulf War Veterans/syndrome/illness. Google generates keyword recommendations on what content is most likely relevant to the target, and the ads will be placed within those sites. The online ads will start running from early November. CCF marketing and study team will monitor them for engagement.

### Number of Subjects

Two veterans were recruited and consented during the reporting period. The subjects were randomly assigned into acupuncture group (to receive acupuncture treatment) and control group (Reiki). The treatment is ongoing. Two more veterans have expressed interest in participating in this study and will be enrolled shortly.

### Summary of Results

N/A

### Summary of Anticipated and Unanticipated Adverse Effects

N/A

### Problem Areas

#### *1) EEG Data Collection*

The current protocol requires using a 64 channel system to collect EEG data. The 64 channels are embedded in a skull cap and require injection of electrode gel (non-invasive) in each of the 64 electrode locations. The set-up takes almost 30 minutes and the subjects sometimes get tired and uncomfortable. The clean-up process after completion of study recording requires a hair wash and can be very inconvenient, especially for subjects with a lot of hair. While the 64-channel system is a very useful research tool, the EEG data collection arrangement has deterred many eligible subjects. We have recently acquired (with DOD approval) an 8 channel system that can collect EMG and EEG data. At present, EMG signals are collected in 3 channels, EEG signals (C3, C4, Cz and Fz locations) in 4 channels and force data in one channel. Since all of the study data is collected within a single system, the data is much cleaner and easy to analyze. The new system also allows us to perform almost all of the proposed analysis and address the study aims. From a subject perspective, the entire EMG/EEG setup requires only 15 minutes instead of the original 30-45 minutes. Post recording clean-up is very fast as the electrode gel in the scalp

can be easily removed with an alcohol wipe without need for a hair wash. Subjects have responded positively to the new data collection system.

## *2) Hand grip force Data Collection*

We currently use a Jamar digital dynamometer to record hand grip force. However, the measurements recorded through the data collection system were not reliable due to technical issues. There were a lot of artifacts/baseline shifts when collecting force data over extended periods of time. To address this issue, we have placed order for a digital hand grip system made by AD Instruments (manufacturer of the EEG/EMG system we currently use). This will allow us to reliably and continuously collect hand grip data.

## **IV. KEY RESEARCH ACCOMPLISHMENTS**

N/A

## **V. CONCLUSION**

Dr. Vernon Lin (co-PI in the original proposal) replaced Dr. Yin Fang as the study PI (with DOD approval). The changes in study personnel delayed study start-up and progress. To address the change in the investigative team, Dr. Lin brought in experienced clinicians and researchers to deliver the study interventions and assist with subject enrollment and study coordination. Dr. Bayram, a rehabilitation/neuroscience researcher from Kessler Rehab has agreed to be a technical consultant and will assist the research team with initial equipment setup and data analysis. As a result of Dr. Bayram's addition, the research team has purchased a new 8-channel EEG/EMG system that is more suitable for study purposes. This system has not only reduced subject preparation time, but also streamlined data collection and improved data quality. Research subjects have welcomed the significant decrease in set-up time and post-recording clean-up time.

The initial proposal included Cleveland VA as a recruitment site. However, per Cleveland VA recommendation, the study will now recruit subjects only at Cleveland Clinic. Study subjects will have to visit Cleveland Clinic two times per week for the intervention. This will limit the number of subjects willing and able to participate in the study. Limited access to Veterans outside Cleveland VA has significantly slowed subject enrollment. The study team is advertising the study through Veterans support organizations, ClinicalTrials.gov, National Gulf War Resource Center's facebook page (thanks to Mr. James Bunker, Executive Director) and placement of online advertisements through Google.

The study team will continue to screen and enroll subjects.

## **VI. PUBLICATIONS, ABSTRACTS, AND PRESENTATIONS**

N/A

## **VII. INVENTIONS, PATENTS AND LICENSES**

N/A

## **VIII. REPORTABLE OUTCOMES**

The study has enrolled 2 subjects and they are undergoing study interventions/treatments.

## **IX. OTHER ACHIEVEMENTS**

N/A